

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 10 of 15

### **REMARKS**

In view of the following discussion, the Applicants respectfully submit that none of the presented claims now pending in the application is anticipated under the provisions of 35 U.S.C. §102 or made obvious under the provisions of 35 U.S.C. §103. Thus the Applicants believe that all of the presented claims are now in allowable form.

#### **I. REJECTION OF CLAIMS 1, 9-12 AND 31 UNDER 35 U.S.C. §102**

The Examiner rejected claims 1, 9-12 and 31 under 35 U.S.C. §102(a) as being anticipated by the Bradley et al. patent application (United States Patent Application Publication No. 2004/0107782, published June 10, 2004, hereinafter referred to as "Bradley"). In response, the Applicants have amended independent claims 1 and 31, from which claims 9-12 depend, in order to more clearly recite aspects of the present invention.

Bradley teaches a portable contaminant sampling system. The system includes a collection unit for collecting and storing a media sample (e.g., taken from the air, a surface, etc.) for analysis. The collection unit includes a fluid chamber and a cap. A sample is drawn in through the cap, which includes a hydrophobic filter and an optional prefilter. The prefilter removes large particles from the sample and directs the remainder of the sample down a funnel, along with a rinse solution, toward the hydrophobic filter. The sample then passes through the hydrophobic filter and into the fluid chamber. The sample may then be stored within the fluid chamber for later analysis.

The Examiner's attention is directed to the fact that Bradley fails to disclose or suggest the novel invention of passing separated particles (i.e., separated from a sample medium such as air) through a hydrophobic membrane and into a liquid, as positively claimed by the Applicants. Specifically, the Applicants' independent claims 1 and 31, as amended, recite:

1. An apparatus for collecting airborne particles comprising:

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 11 of 15

an air intake assembly for drawing an air sample into the apparatus;

a separation section coupled to the air intake assembly for separating particles from the air sample;

a capture section coupled to the separation section for transporting the separated particles in a liquid; and

a hydrophobic membrane disposed between the separation section and the capture section for establishing a controllable boundary therebetween. (Emphasis added)

31. A method for collecting airborne particles, comprising the steps of:  
collecting an air sample;  
separating the air sample into a particle flow and a primary air flow;  
concentrating the particle flow; and  
passing the separated particle flow through a hydrophobic membrane and into a liquid. (Emphasis added)

The Applicants' invention is directed to a method and apparatus for concentrated airborne particle collection. Current systems for sampling air to detect contamination are often very large and noisy and consume a great deal of power, which make them impractical for private (e.g., civilian) use. Moreover, they tend to produce very dilute samples (e.g., as in the case of contaminant particles contained within a liquid), which can take a long time to analyze. Therefore, such systems are not ideal for use in environments where contamination must be detected quickly.

The Applicants' invention is a method and apparatus for airborne particle collection that efficiently produces concentrated particle samples for analysis. One embodiment of the inventive apparatus includes an air intake assembly, a separation section, a capture section and a hydrophobic membrane. The air intake assembly draws an air sample (including air and airborne particles) into the separation section, which then separates the particles from the air. The separated particles are then passed through the hydrophobic membrane into the capture section, which includes a liquid for capturing and transporting the particles. By separating the particles from the air prior to passing the particles through the hydrophobic membrane, higher particle

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 12 of 15

concentration in the capture liquid is achieved, thereby facilitating subsequent analysis of the particles.

By contrast, Bradley teaches passing unseparated air samples (e.g., including both air and particles) through a hydrophobic filter for capture in a fluid. That is, the apparatus taught by Bradley does not separate the particles from the remainder of the medium in which they are carried prior to depositing the particles in the catchment fluid.

As discussed, the Applicants' collector separates airborne particles from the air in which the particles are carried prior to passing the particles through a hydrophobic membrane and into a liquid. This improves the collection efficiency of the collector by achieving a higher particle concentration in the liquid. Bradley, on the other hand, passes the entire sample – e.g., air and particles – through the hydrophobic filter and into the catchment fluid (See, e.g., Bradley at paragraph 0063: "As the sample is taken, the sample [particles] and the media in which it is contained, whether air or liquid, passes through the pre-filter (optional) through the hydrophobic filter by way of the funnel and into the fluid chamber", emphasis added). The only separation that occurs as taught by Bradley is the separation of large particles from the sample (e.g., because the large particles will not pass through the pores of the filter). Unlike the particles separated by the Applicants' invention, however, these large particles are not passed through the hydrophobic filter and are not captured in the catchment fluid. Thus, Bradley teaches only a limited separation of particles from the sample medium, and does not treat the limited quantity of separated particles in the same manner that the Applicants' collector does.

Bradley thus fails to teach, show or suggest the novel invention of passing separated particles (i.e., separated from a sample medium such as air) through a hydrophobic membrane and into a liquid, as claimed in Applicants' independent claims 1 and 31. Therefore, the Applicants submit that independent claims 1 and 31 fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

Dependent claims 9-12 depend from claim 1 and recite additional features therefore. As such, and for at least the same reasons set forth above, the Applicants

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 13 of 15

submit that claims 9-12 are not anticipated by the teachings of Bradley. Therefore, the Applicants submit that dependent claims 9-12 also fully satisfy the requirements of 35 U.S.C. §102 and are patentable thereunder.

## **II. REJECTION OF CLAIMS 24 AND 27 UNDER 35 U.S.C. §103**

The Examiner rejected claims 24 and 27 under 35 U.S.C. §103(a) as being unpatentable over Bradley in view of the Masquelier et al. patent (United States Patent No. 6,520,034, issued February 18, 2003, hereinafter referred to as "Masquelier"). In response, the Applicants have amended independent claim 24, from which claim 27 depends, in order to more clearly recite aspects of the present invention.

Bradley has been discussed above. Masquelier teaches a high air volume to low liquid volume aerosol collector. An annular, centripetal slot in the collector draws a high-volume flow of aerosol particles into the collector. This flow of aerosol particles is then directed into a small volume of liquid within the collector. Particles are embedded in the liquid, while the air passes through the liquid and is discharged from the collector.

The Examiner's attention is directed to the fact that Masquelier, like Bradley, fails to disclose or suggest the novel invention of passing separated particles (*i.e.*, separated from a sample medium such as air) through a hydrophobic membrane and into a liquid, as positively claimed by the Applicants. Specifically, the Applicants' independent claim 24, as amended, recites:

24. A system for analyzing airborne particles comprising:  
a particle collection apparatus adapted to collect airborne particles comprising:  
an air intake assembly for drawing an air sample into the apparatus;  
a separation section coupled to the intake assembly for separating particles from the air sample;  
a capture section coupled to the separation section for transporting the separated particles in a liquid; and  
a hydrophobic membrane disposed between the separation section and the capture section for establishing a controllable air/fluid boundary therebetween; and

406246-1

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 14 of 15

a particle analysis device coupled to the collection apparatus for receiving a liquid sample from the capture section. (Emphasis added)

As discussed above, Bradley teaches passing unseparated air samples (e.g., including both air and particles) through a hydrophobic filter for capture in a fluid. That is, the apparatus taught by Bradley does not separate the particles from the remainder of the medium in which it is carried before depositing the particles in a collection fluid. Masquelier fails to bridge this gap in the teachings of Bradley. Specifically, Masquelier also fails to teach or suggest separating the particles from the medium in which they are carried prior to depositing the particles in a collection fluid.

Bradley and Masquelier, singly or in any permissible combination, thus fail to teach, show or suggest the novel invention of passing unseparated air samples (e.g., including both air and particles) through a hydrophobic filter for capture in a fluid, as claimed in Applicants' independent claim 24. Therefore, the Applicants submit that independent claim 24 fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Dependent claim 27 depends from claim 24 and recites additional features therefore. As such, and for at least the same reasons set forth above, the Applicants submit that claim 27 is not made obvious by the teachings of Bradley in view of Masquelier. Therefore, the Applicants submit that dependent claim 27 also fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

### **III. ALLOWABLE SUBJECT MATTER**

The Examiner has objected to claims 13-17 as being dependent upon a rejected base claim. The Examiner concludes that these claims would be allowable subject matter if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The Applicants thank the Examiner for indicating the allowable subject matter with respect to these claims. However, in view of the arguments set forth above, the

Response to Office Action dated August 5, 2005  
Serial No. 10/603,119  
Page 15 of 15

Applicants believe that the base claims (and all intervening claims) are in allowable form and, as such, the dependent claims 13-17, as they stand, are also in allowable condition. Therefore, the Applicants respectfully request that the foregoing objections to claims 13-17 be withdrawn.

#### **IV. ALLOWABLE SUBJECT MATTER**

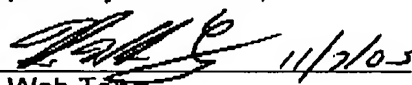
The Applicants thank the Examiner for indicating the reinstatement of previously withdrawn claim 14. The status identifier for claim 14 has been updated to reflect the reinstatement of claim 14 as an original claim.

#### **CONCLUSION**

Thus, Applicants submit that none of the claims presently in the application are anticipated or made obvious under the provisions of 35 U.S.C. §102 and §103. Consequently, Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited. If applicable, Applicants also reserve the rights to file one or more continuation applications for any canceled claims in the present application.

If the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

  
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